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Journal of Statistics and Management Systems

ISSN: 0972-0510 (Print) 2169-0014 (Online) Journal homepage: http://www.tandfonline.com/loi/tsms20

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To cite this article: Priya Kushwaha, Preeti Yadav & Jagdish Prasad (2018) Impact of enterprise resource planning on human resource management in automobile sector: Statistical analysis, Journal of Statistics and Management Systems, 21:4, 601-615, DOI: 10.1080/09720510.2018.1466967

To link to this article: https://doi.org/10.1080/09720510.2018.1466967

Published online: 19 Jun 2018.

Journal of Statistics & Management Systems
ISSN 0972-0510 (Print), ISSN 2169-0014 (Online)
Vol. 21 (2018), No. 4, pp. 601–615
DOI : 10.1080/09720510.2018.1466967

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Impact of enterprise resource planning on human resource management in automobile sector: Statistical analysis

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Abstract

Information Technology is a boon for any organization to boost the productivity. The productivity of any organization has been shown through Human Resource Management (HRM) and for effective Human Resource Management; information technology plays a main role. So for this, Enterprise Resource Planning (ERP) is one of those technologies which help an organization to boost the productivity. In the study three companies Shriram pistons & Rings Ltd, Bosch and Tata of automobile sector have been taken to conduct the study with the aim to measure the impact of ERP on HRM and also compare their effectiveness regarding ERP on HRM by using questionnaire method. The study revealed that ERP helps consistently and gives higher performances on HRM of these companies.

Subject Classification: *62Q99*

Keywords: *Enterprise Resource Planning (ERP), Human Resource Management (HRM), Information Technology (IT), Automobile Sector, Human Resource Information System (HRIS).*

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1. Introduction

The success of an organization totally depends on effective human resource management with faster processing of access and retrieval of data, this requires a proper software system in terms of back-end, front-end with three tier system along with hardware to execute in proper way. So for this, application of Information Technology like Enterprise Resource Planning (ERP) is the solution which handles the problem with the proper system [5].

ERP is a software backbone for many companies because it integrates & automates many internal business processes and information systems and it is also the necessity for many companies to gain the efficiency, agility and responsiveness required to succeed. ERP gives a company an instantaneous outlook of its core business process, such as production, order processing and inventory management.

2. Literature Review

Broderick & Boudreau (1992), proposed a framework to help managers considered how HR Information Technology can improved human resources management and contributed to competitive advantage. After survey and research suggested that the majority of HR information technology investments are in transaction processing, reporting, and tracking computer applications

Hitt, Wu & Zhou (2002), discussed about ERP and showed the business impact & Productivity measures when investing in ERP and showed the comparison between ERP adopters & Non-Adopters and also showed the business impact of three stages while adoption of ERP: (a) Prior Stage (b) During (c) Post-adoption. At last they concluded with the results that ERP adopters are consistently higher in performance across a wide variety of measures than non-adopters. Their results suggested that most of the gains occur during the implementation period. The financial markets consistently rewarded the adopters with higher market valuation both during and after the adoption. They also suggested with their results that indeed ERP systems yield substantial benefits to the firms that adopt them. Rambol, Ahmad & Sharma (2012), discussed about the importance of Enterprise Resource Planning (ERP), its efficiency, major benefits and the application of Information Technology and they concluded with the results that ERP is the only solution to face all the changes emerged due to changed business environment & also for the problems due to

preventing traditional system of working in terms of data accessibility for the heterogeneous platform through the ERP solution.

3. Purpose of the study

- To see the impact of ERP on Human Resource Management (HRM) in these companies.
- To compare the effectiveness of ERP on Human Resource Management in these companies.

4. Research Methodology

The study is empirical in nature in which the variables have been described thoroughly graphical as well as comparison based on percentage basis and through Z-test. The data has been collected from three companies Shriram Pistons & Rings Ltd., Bosch and Tata of Automobile sector to conduct the study. In the research the sample size 80 from these companies together in which 16, 32 and 32 samples have been taken from Shriram Pistons & Rings Ltd., Bosch and Tata respectively. The study is based on primary data collected through structured questionnaire. Likert-type items on a five point scale and some open-ended questions were employed in the survey to measure the impact of ERP on HRM. The instrument for the collection of data was developed by Beadles II, Lowery and Johns (2005). The middle level managers have been targeted for the research.

5. Impact of Enterprise Resource Planning (ERP) on Human Resource Management (HRM) in these companies

After conducting survey, the companies have a great impact on the functioning of HR department after implementing ERP. Results are shown in the following table:

Table 1

Time savings and Improvement

Items	Shriram (% agree)	Bosch (% agree)	Tata (% agree)
HRIS has decreased the time spent on recruiting and improved the recruitment	100%	100%	97%
HRIS has decreased the time spent on training and improved the training process	100%	100%	100%
HRIS has improved the data input and data maintenance process	100%	100%	78%
HRIS has decreased the time spent on communicating information within the organization	94%	72%	91%
HRIS has decreased the time spent on processing paperwork	100%	100%	100%
HRIS has decreased the time spent on correcting errors	100%	81%	100%
HRIS has decreased the time spent on making staff decisions	100%	100%	100%
HRIS has decreased the time spent on feeding the data	100%	81%	100%
HRIS has improved the Accuracy of planning	100%	97%	81%

Table 2

Cost savings

Items	Shriram (% agree)	Bosch (% agree)	Tata (% agree)
HRIS has decreased cost of employing	100%	81%	50%
HRIS has decreased recruiting expenses	38%	31%	44%
HRIS has decreased training expenses	38%	31%	44%

Table 3
HRIS Effectiveness

Items	Shriram (% agree)	Bosch (% agree)	Tata (% agree)
Are you satisfied with HRIS?	100%	97%	100%
HRIS has met your expectations	100%	94%	100%
Are you satisfied with the flexibility of the system?	100%	87%	100%
HRIS could be better utilized	100%	72%	100%
HRIS has made HR decision-making more effective	100%	100%	100%
HRIS has helped in forecasting the staff needs like allotment of house, promotions etc	94%	53%	28%
HRIS has helped with forecasting need of more staff	100%	100%	94%
HRIS has increased security concerns	81%	62%	34%
HRIS has created environment of open communication between employees and management	100%	91%	69%
HRIS compensation management system helps in smooth function of payroll management	81%	81%	100%
HRIS is effective in meeting strategic goals	100%	100%	100%

Table 4
Information effects

Items	Shriram (% agree)	Bosch (% agree)	Tata (% agree)
Information generated from HRIS has increased coordination between HR department & top administrators	94%	81%	94%
Information generated from HRIS has added value to the organization	100%	84%	100%
Information generated from HRIS helps organization to make more effective promotion decisions	100%	75%	94%
Information generated from HRIS helps organization make better decisions in selecting best people	94%	81%	100%
Information generated from HRIS helps organization decided when training & skill development are necessary	100%	78%	91%
Information generated from HRIS has improved the strategic decision making of top administrators	100%	81%	100%

6. Effectiveness of ERP on Human Resource Management in these companies

After analyzing so many factors it is proved that ERP has a great impact on HRM in these companies but how much it affects these companies? The comparison of their functioning, performances time savings and improvement has already been done above by the percentage method. Now the time to prove statistically that is there any significance effect among these three companies or not.

- There are five factors in **Time Savings & Improvement** in which the differences have been shown:
  1. HRIS has improved the data input and data maintenance process
  2. HRIS has decreased the time spent on communicating information within the organization.

3. HRIS has decreased the time spent on correcting errors.
4. HRIS has decreased the time spent on feeding the data.
5. HRIS has improved the accuracy of planning.

Now Z-test is going to be applied to check the significance effect of the proportion among these three companies with respect to these five factors.

- **Hypotheses for the first factor "HRIS has improved the data input and data maintenance process" among Shriram pistons, Bosch and Tata.**

$\mathbf{H_{01}}$: There is no significant increment in the proportions for the above factor between Shriram pistons and Tata.

$\mathbf{H_{a1}}$: There is a significant increment in the proportions for the above factor between Shriram pistons and Tata.

$\mathbf{H_{02}}$: There is no significant increment in the proportions for the above factor between Bosch and Tata.

$\mathbf{H_{a2}}$: There is a significant increment in the proportions for the above factor between Bosch and Tata.

$$Z = \frac{p_1 - p_2}{\sqrt{\hat{p}\hat{q}(1/n_1 + 1/n_2)}}$$

The calculated value of Z-test for first hypothesis is 2.05 and second hypothesis is 3.14which is greater than the tabulated value of Z-test at 5% level of significance with one-tailed test= 1.645, that means null hypothesis is rejected. **So, there is a significant increment for the factor "HRIS has improved the data input and data maintenance process" among Shriram pistons, Bosch and Tata.**

- **Hypotheses for the second factor "HRIS has decreased the time spent on communicating information within the organization" among Shriram pistons, Bosch and Tata.**

$\mathbf{H_{01}}$**:** There is no significant increment in the proportion for the above factor between Shriram pistons and Bosch.

$\mathbf{H_{a1}}$**:** There is a significant increment in the proportion for the above factor between Shriram pistons and Bosch.

$\mathbf{H_{02}}$**:** There is no significant increment in the proportion for the above factor between Bosch and Tata.

H_{a2}: There is a significant increment in the proportion for the above factor between Bosch and Tata.

The calculated value of Z-test for first hypothesis is 1.83 and for second hypothesis is 2.11, which is greater than the tabulated value of Z-test= 1.645, that means null hypothesis is rejected. **So, there is a significant increment for the factor "HRIS has decreased the time spent on communicating information within the organization" among Shriram pistons, Bosch and Tata.**

Similarly, hypotheses for the third, fourth and fifth factor:

For **third** factor:

H_{01}: There is no significance effect for the above factor between Shriram pistons and Bosch.

H_{a1}: There is a significance effect for the above factor between Shriram pistons and Bosch.

H_{02}: There is no significance effect for the above factor between Tata and Bosch.

H_{a2}: There is a significance effect for the above factor between Tata and Bosch.

For **fourth** factor:

H_{03}: There is no significance effect for the above factor between Shriram pistons and Bosch.

H_{a3}: There is a significance effect for the above factor between Shriram pistons and Bosch.

H_{04}: There is no significance effect for the above factor between Bosch and Tata.

H_{a4}: There is a significance effect for the above factor between Bosch and Tata.

For **fifth** factor:

H_{05}: There is no significance effect for the above factor between Shriram pistons and Tata.

H_{a5}: There is a significance effect for the above factor between Shriram pistons and Tata.

H_{06}: There is no significance effect for the above factor between Bosch and Tata.

H_{a6}: There is a significance effect for the above factor between Bosch and Tata.

The calculated value of Z-test for third factor is 1.9 and 2.53, for fourth factor 1.9 and 2.53, for fifth factor 1.9 and 1.9 which is greater than the tabulated value of Z-test= 1.645, that means null hypothesis is rejected in all the cases. **So, there is a significance effect for all the above factors among Shriram pistons, Bosch and Tata.**

- Mainly there is one factor in **cost savings** in which a huge difference has been shown among Shriram Pistons, Bosch and Tata.

❖ **Three hypotheses for the factor "HRIS has decreased cost of employing" among Shriram pistons, Bosch and Tata.**

H_{01}: There is no significance effect for the above factor between Shriram pistons and Bosch.

H_{a1}: There is a significance effect for the above factor between Shriram pistons and Bosch.

H_{02}: There is no significance effect for the above factor between Shriram Pistons and Tata.

H_{a2}: There is a significance effect for the above factor between Shriram Pistons and Tata.

H_{03}: There is no significance effect for the above factor between Bosch and Tata.

H_{a3}: There is a significance effect for the above factor between Bosch and Tata.

The calculated value of Z-test for the first is 1.9, for second 3.57 and for third 2.81 which is greater than the tabulated value of Z-test= 1.645, that means null hypothesis is rejected in all the cases. **So, there is a significance effect for the above factor among Shriram pistons, Bosch and Tata.**

For second and third factor "HRIS has decreased training and recruiting expenses" there is no significance effect has been shown among Shriram Pistons, Bosch and Tata.

- There are six factors in **HRIS Effectiveness** in which the differences have been shown:
  1. Are you satisfied with the flexibility of the system?
  2. HRIS could be better utilized.
  3. HRIS has helped in forecasting the staff needs like allotment of house, promotions etc.
  4. HRIS has increased security concerns
  5. HRIS has created environment of open communication between employees and management.
  6. HRIS compensation management system helps in smooth function of payroll management.

- **Hypotheses for the above factors among Shriram pistons, Bosch and Tata.**

For **first** factor:

H_{01}: There is no significance effect for the above factor between Shriram pistons and Bosch.

H_{a1}: There is a significance effect for the above factor between Shriram pistons and Bosch.

H_{02}: There is no significance effect for the above factor between Bosch and Tata.

H_{a2}: There is a significance effect for the above factor between Bosch and Tata.

For **second** factor:

H_{03}: There is no significance effect for the above factor between Shriram pistons and Bosch.

H_{a3}: There is a significance effect for the above factor between Shriram pistons and Bosch.

For **third** factor:

H_{04}: There is no significance effect for the above factor between Shriram pistons and Bosch.

H_{a4}: There is a significance effect for the above factor between Shriram pistons and Bosch.

H_{05}: There is no significance effect for the above factor between Shriram Pistons and Tata.

H_{a5}: There is a significance effect for the above factor between Shriram Pistons and Tata.

H_{06}: There is no significance effect for the above factor between Bosch and Tata.

H_{a6}: There is a significance effect for the above factor between Bosch and Tata.

For **fourth** factor:

H_{07}: There is no significance effect for the above factor between Shriram pistons and Tata.

H_{a7}: There is a significance effect for the above factor between Shriram pistons and Tata.

H_{08}: There is no significance effect for the above factor between Bosch and Tata.

H_{a8}: There is a significance effect for the above factor between Bosch and Tata.

For **fifth** factor:

H_{09}: There is no significance effect for the above factor between Shriram pistons and Tata.

H_{a9}: There is a significance effect for the above factor between Shriram pistons and Tata.

H_{010}: There is no significance effect for the above factor between Bosch and Tata.

H_{a10}: There is a significance effect for the above factor between Bosch and Tata.

For **sixth** factor:

H_{011}: There is no significance effect for the above factor between Shriram pistons and Tata.

H_{a11}: There is a significance effect for the above factor between Shriram pistons and Tata.

H_{012}: There is no significance effect for the above factor between Bosch and Tata.

H_{a12}: There is a significance effect for the above factor between Bosch and Tata.

The calculated value of Z-test for first factor is 4.95 and 2.16, for second factor 2.47, for third factor 2.85, 43.33 and 2.08, for fourth factor 31.33 and 2.27, for fifth factor 2.66 and 2.17, for sixth factor 2.71 and 2.53 which is greater than the tabulated value of Z-test= 1.645, that means null hypothesis is rejected in all the cases. **So, there is a significance effect for all the above factors among Shriram pistons, Bosch and Tata.**

- There are five factors in **Information Effects** in which the differences have been shown:
  1. Information generated from HRIS has added value to the organization.
  2. Information generated from HRIS helps organization to make more effective promotion decisions.
  3. Information generated from HRIS helps organization make better decisions in selecting best people.
  4. Information generated from HRIS helps organization decided when training & skill development are necessary.
  5. Information generated from HRIS has improved the strategic decision making of top administrators.

❖ **Hypotheses for the above factors among Shriram pistons, Bosch and Tata.**

For **first** factor:

H_{01}: There is no significance effect for the above factor between Shriram pistons and Bosch.

H_{a1}: There is a significance effect for the above factor between Shriram pistons and Bosch.

H_{02}: There is no significance effect for the above factor between Bosch and Tata.

H_{a2}: There is a significance effect for the above factor between Bosch and Tata.

For **second** factor:

H_{03}: There is no significance effect for the above factor between Shriram pistons and Bosch.

H_{a3}: There is a significance effect for the above factor between Shriram pistons and Bosch.

H_{04}: There is no significance effect for the above factor between Bosch and Tata.

H_{a4}: There is a significance effect for the above factor between Bosch and Tata.

For **third** factor:

H_{05}: There is no significance effect for the above factor between Bosch and Tata.

H_{a5}: There is a significance effect for the above factor between Bosch and Tata.

For **fourth** factor:

H_{06}: There is no significance effect for the above factor between Shriram pistons and Bosch.

H_{a6}: There is a significance effect for the above factor between Shriram pistons and Bosch.

For **fifth** factor:

H_{07}: There is no significance effect for the above factor between Shriram pistons and Bosch.

H_{a7}: There is a significance effect for the above factor between Shriram pistons and Bosch.

The calculated value of Z-test for the first factor is 1.77 and 2.66, for second factor 2.27 and 1.97, for third factor 2.53, for fourth factor 2.05 and for fifth factor 1.9 which is greater than the tabulated value of Z-test= 1.645, that means null hypothesis is rejected in all the cases. **So, there is a significance effect for the above factors among Shriram pistons, Bosch and Tata.**

7. Results

The result of the impact of ERP on Human Resource Management has been evaluated by using frequency tables to measure the percentage of favorable responses to a series of questions. The results of the survey are contained in Table 1 through 4. The percentages expressed the percentage of the respondents for each item who either agreed or strongly agreed with the statement.

8. Conclusion

The study aimed to measure the impact of ERP on HRM and also compare their effectiveness regarding ERP on HRM by using questionnaire method. The responses are divided into four categories i.e. (1) Time savings and improvement (2) Cost savings (3) HRIS Effectiveness (4) Information Effects. Results of the survey can be shown in table 1 through table 4. The factors which have shown the significance effect are as follows: (a) HRIS has improved the data input and data maintenance process. (b) HRIS has decreased the time spent on communicating information within the organization. (c) HRIS has decreased the time spent on correcting errors. (d) HRIS has decreased the time spent on feeding the data. (e) HRIS has improved the accuracy of planning. (f) HRIS has decreased cost of employing. (g) Are you satisfied with the flexibility of the system? (h) HRIS could be better utilized. (i) HRIS has helped in forecasting the staff needs like allotment of house, promotions etc. (j) HRIS has increased security concerns. (k) HRIS has created environment of open communication between employees and management. (l) HRIS compensation management system helps in smooth function of payroll management. (m) HRIS has added value to the organization. (n) HRIS helps organization to make more effective promotion decisions. (o) HRIS helps organization make better decisions in selecting best people. (p) HRIS helps organization decided when training & skill development are necessary. (q) HRIS has improved the strategic decision making of top administrators. The factor which does not shows the significant effect is HRIS has decreased training and recruiting expenses.

References

[1] Beadles, I. I., Aston, N., Lowery, C. M., & Johns, K. (2005). The impact of human resource information systems: An exploratory study in the public sector. Communications of the IIMA, 5(4), 6.

[2] Broderick, R., & Boudreau, J. W. (1992). Human resource management, information technology, and the competitive edge. The Executive, 6(2), 7-17.

[3] Hitt, L. M., & DJ Wu, X. Z. (2002). Investment in enterprise resource planning: Business impact and productivity measures. *Journal of Management Information Systems*, 19(1), 71-98.

[4] Rambol, R. K., Ahmad, N., & Sharma, B. K. (2012). Efficient Data Accessing through Heterogeneous ERP Solution. *International Journal of Computer Applications,* 53(6).

[5] Peir-Yuan Patrick Li , Fu-Jin Wang, "Effects of human resource staff ing strategies on organizational performance in catering industry", In *Journal of Information and Optimization Sciences,* Volume 32, Issue 3, 2013.

Received October, 2017